CLAIMS

What is claimed is:

1. A method of tube current modulation for radiographic data acquisition, the method comprising the steps of:

identifying a plurality of modulation points on a waveform indicative of at least one of subject size and subject shape;

determining a modulation factor at the plurality of modulation points; and

generating a modulation tube current waveform that substantially approximates the waveform indicative of at least one of subject size and subject shape based on a modulation factor at the plurality of modulation points.

2. The method of claim 1 further comprising the step of carrying out a scout scan of a subject to determine the waveform indicative of at least one of subject size and subject shape.

3, The method of claim 1 wherein the step of identifying includes the step of inspecting one-half of a modulating cycle.

4. The method of claim 1 further comprising the step of modifying each modulation factor by an error value that is dependent upon a slope of the waveform at a respective modulation point.

5. The method of claim 4 further comprising the step of increasing the modulation factor as a function of time if the slope at a respective modulation point is greater than 1.0 and increasing the modulation factor as a function of magnitude if the slope at a respective modulation point is less than 1.0.

6. The method of claim 1 wherein the plurality of modulation points include points at ten percent, ninety percent, and one-hundred percent of waveform magnitude.

7. The method of claim 1 further comprising the step of determining the modulation factor of each modulation point based on a polynomial expression of subject size and subject shape at each modulation point.

8. The method of claim 1 further comprising the step of generating the waveform based on changes in oval ratio and diameter of a subject during acquisition of scout scan data.

9. A CT system comprising:

a gantry having an opening to receive a subject to be scanned;

a high frequency electromagnetic energy projection source configured to project a high frequency electromagnetic energy beam toward the subject;

a scintillator array having a plurality of scintillator cells, wherein each cell is configured to detect high frequency electromagnetic energy passing through the subject;

a photodiode array optically coupled to the scintillator array and comprising a plurality of photodiodes configured to detect light output from a corresponding scintillator cell;

a data acquisition system (DAS) connected to the photodiode array and configured to receive the photodiode outputs;

an image reconstructor connected to the DAS and configured to reconstruct an image of the subject from the photodiode outputs received by the DAS; and

a computer programmed to:

determine an ideal tube current modulation waveform to control projection of high frequency electromagnetic energy by the high frequency electromagnetic energy projection source for CT data acquisition from the subject;

evaluate the ideal tube current modulation waveform at a plurality of magnitudes; and

determine an approximate tube current modulation waveform from values at the plurality of magnitudes.

10. The CT system of claim 9 wherein the computer is further programmed to control the high frequency electromagnetic energy projection source such that high frequency electromagnetic energy projection toward the subject conforms to the approximate tube current modulation waveform.

11. The CT system of claim 9 wherein the computer is further programmed to determine the ideal tube current modulation waveform from a scout scan.

12. The CT system of claim 11 wherein the computer is further programmed to carry out the scout scan to determine a size and a shape of the subject.

13. The CT system of claim 12 wherein the computer is further programmed to determine the size and the shape from data acquired in one-quarter of gantry rotation.

14. The CT system of claim 13 wherein the ideal tube current modulation waveform is a function of oval ratio and minimum subject diameter during a one-quarter quantity rotation cycle.

15. The CT system of claim 9 wherein the plurality of magnitudes includes three separate magnitudes on a normalized ideal tube current modulation waveform.

16. The CT system of claim 15 wherein the three magnitudes correspond to values at 10 percent, 90 percent, and 100 percent of peak waveform magnitude.

17. The CT system of claim 15 wherein the computer is further programmed to increase in number the plurality of magnitudes that are evaluated to reduce differences

between the ideal tube current modulation waveform and the approximate tube current modulation waveform.

18. A computer readable storage medium having a computer program stored thereon and representing a set of instructions that when executed by a computer causes a computer to:

command a radiographic data acquisition system to carry out a scout scan to acquire pre-scan data indicative of subject size and subject shape;

determine a first tube current modulation waveform ideal for the subject size and the subject shape from the pre-scan data;

evaluate a portion of the first tube current modulation waveform corresponding to ninety degrees of gantry rotation; and

determine a second tube current modulation waveform that approximates the first tube current modulation waveform from the portion of the first modulation waveform.

19. The computer readable storage medium of claim 18 wherein the set of instructions further causes the computer to normalize the portion of the first tube current modulation waveform to a peak magnitude of one and determine the second tube current modulation waveform by evaluating more then two points along the normalized portion of the first modulation waveform.

20. The computer readable storage medium of claim 19 wherein the set of instructions further causes the computer to control an x-ray source to project x-rays toward a subject based on the second tube current modulation waveform.